

**Effective Date:** Spring 2009-2010

**Course Description**

Prerequisite: a grade of "C" or higher in CHEM 1201, and MATH 1021 or MATH 1023. A continuation of CHEM 1201. Additional theory and quantitative problem solving with emphasis on solution chemistry, equilibrium, kinetics, entropy, and free energy. Students cannot use both this course and CHEM 1002 to meet a degree's requirements.

**Course Objectives**

Students will:

1. Understand the fundamentals of chemistry as presented in the topical outline.
2. Develop critical thinking and problem solving skills.
3. Be able to read and use data presented in graphs and charts.

**Procedures to Evaluate these Objectives**

1. In-class problems after concept presentation
2. In-class exams
3. Cumulative final exam

**Use of Results of Evaluation to Improve the Course**

1. Student responses to in-class problems will be used to immediately help clarify any misunderstandings and to later adjust the appropriate course material.
2. All exams will be graded and examined to determine areas of teaching which could use improvement.
3. All evaluation methods will be used to determine the efficacy of the material presentation.

**Detailed Topical Outline**

1. Chemistry of liquids and solids
2. Solution chemistry
3. Chemical kinetics
  - a. Reaction rates
  - b. Rate Laws
  - c. Rate mechanisms
4. Chemical equilibrium
  - a. Equilibrium constant
  - b. Le Châteliers Principle
5. Acids and bases
  - a. Definition of an acid and base
  - b. pH scale
  - c. Buffers

- 6.     Precipitation reactions
- 7.     Thermochemistry - spontaneity
  - a.     Entropy
  - b.     Free energy
- 8.     Electrochemistry
  - a.     Oxidation-reduction reactions
  - b.     Batteries
- 9.     Nuclear chemistry
  - a.     Types of decay
  - b.     Decay kinetics